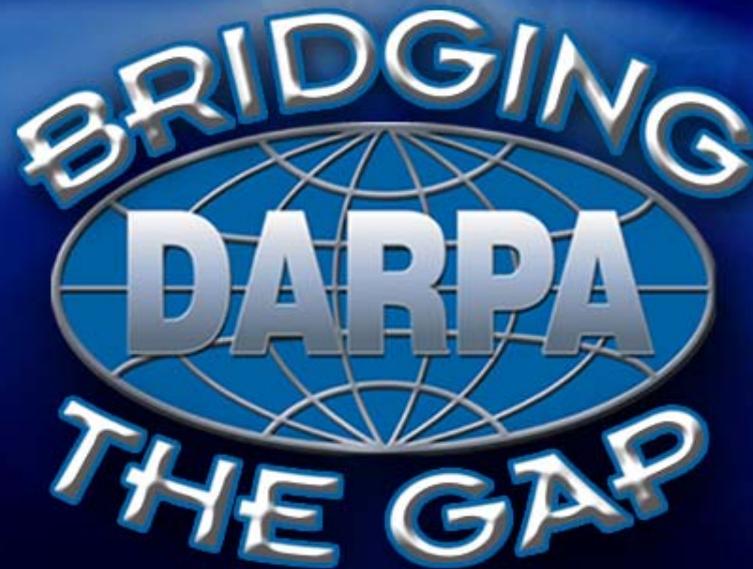
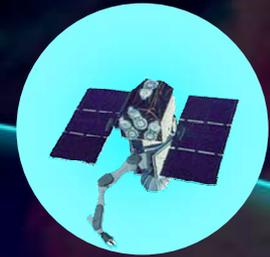
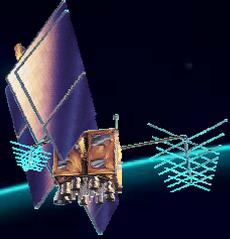


# Space Access and Awareness: The Future Skyways

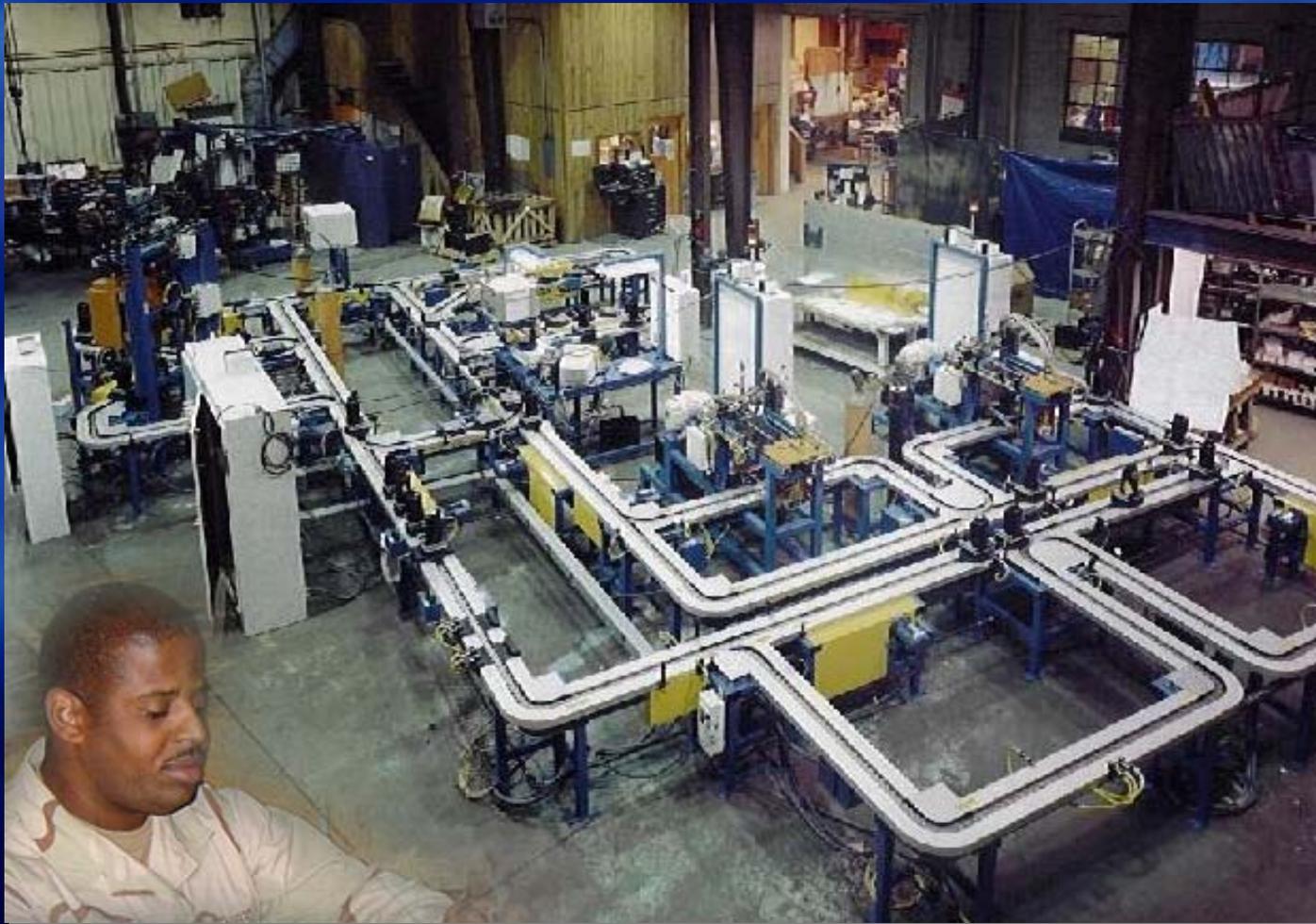
Timothy P. Grayson



# Vision 2015: On-Orbit Assembly



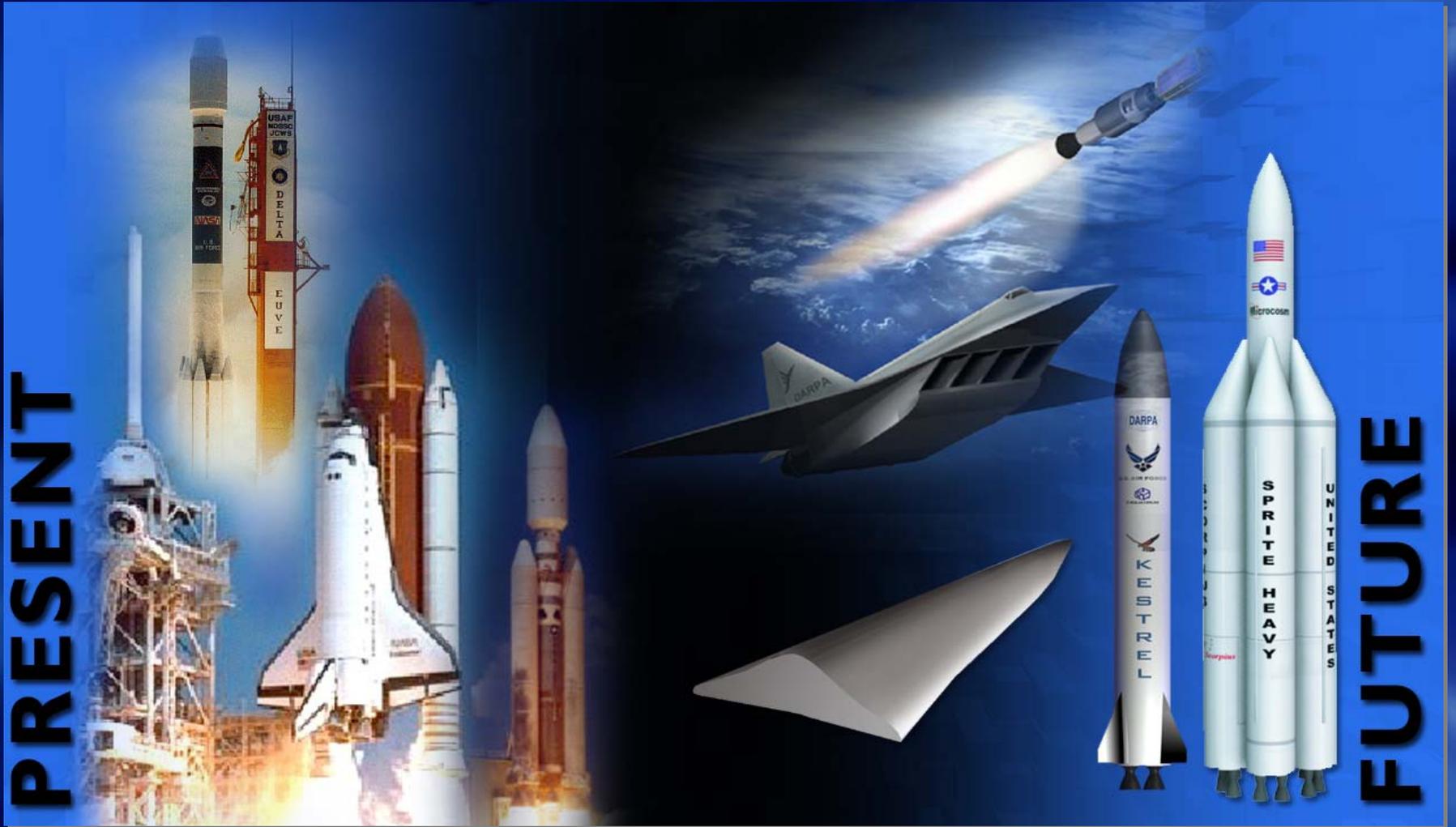
# Vision 2015: Responsive Spacecraft Integration



# Vision 2015: Responsive Launch



# Space Access

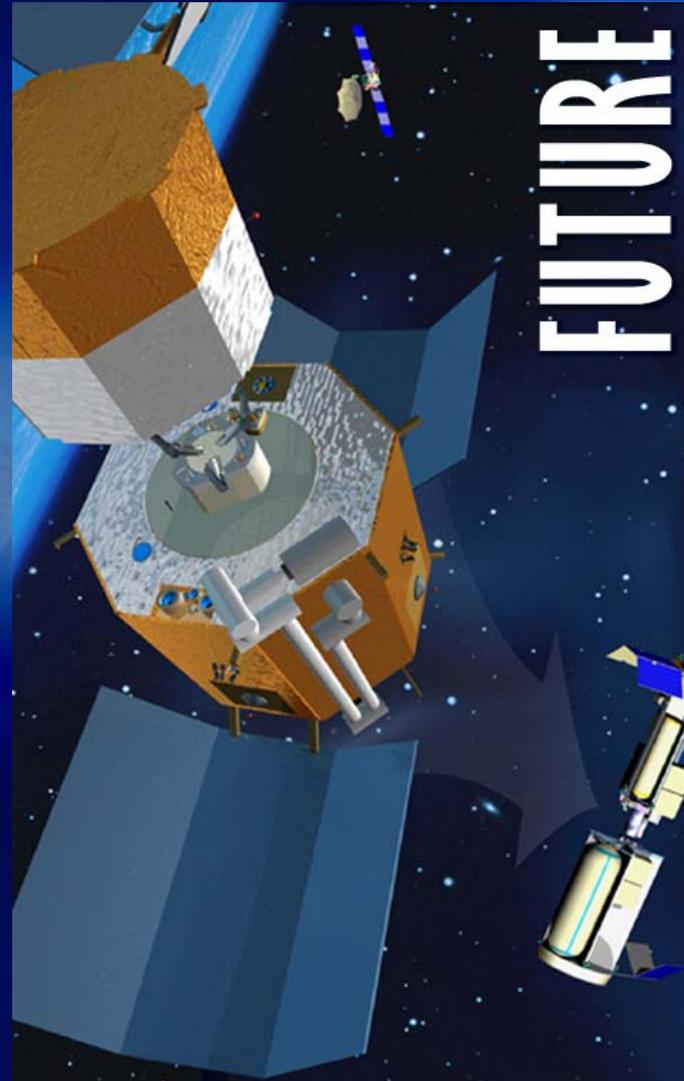
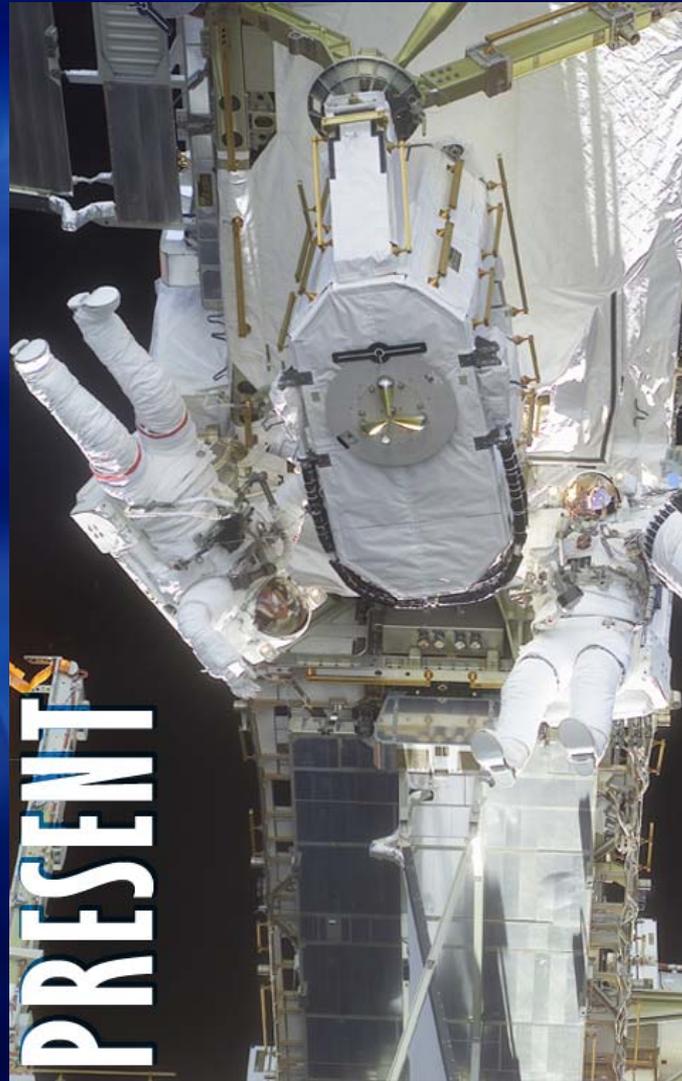


# Access Technologies

- Simple or even no turbo-pumps
- Rapidly manufacturable composite fuel tanks
- Ablative thrust chambers
- Flexible launch system architectures and infrastructure



# SPACE INFRASTRUCTURE



# INFRASTRUCTURE TECHNOLOGY

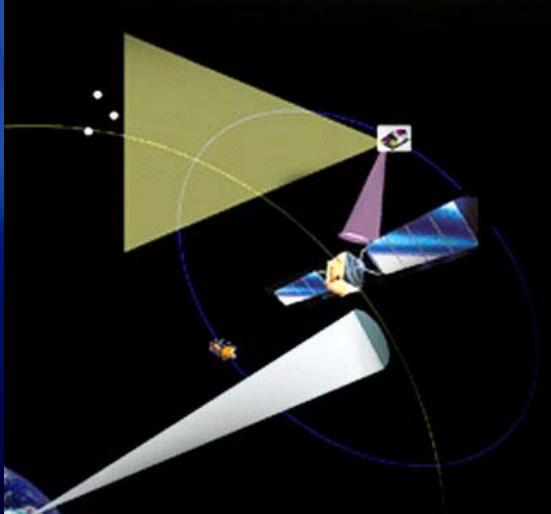
- Modular spacecraft designs
- Robotic spacecraft sensors and processing algorithms
- Flexible manipulators with a “sense of touch”
- On-orbit manufacturing!



# Space Situational Awareness

**PRESENT**

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1 29129U 03058A 04019.10025195 -.00000080 00000-0 00000-0 0 400  
2 29129 55.0926 0.8961 0054926 278.8067 60.5748 2.00573505 649  
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1 29130U 03058B 04019.51682995 .00134478 -19475-5 66483-3 0 328  
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2 29133 23.8363 85.5096 5933444 4.9317 359.1477 2.01470867 475



**FUTURE**



# INFRASTRUCTURE TECHNOLOGY

- Space-based systems for global search with performance approaching ground systems
- Novel light-weight optics
- Smart focal plane sensor concepts
- Automated tasking, data correlation, and analysis





**Technology to Make Space Operations  
as routine as Air Operations**

